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09/465,592	12/17/1999	JOANNE P. CULVER	LAZE-01000US	9065

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EXAMINER
CHU, KIM KWOK

ART UNIT	PAPER NUMBER
2653	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/465,592	Applicant(s) CULVER ET AL.	
	Examiner Kim-Kwok CHU	Art Unit 2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed on 5/17/2004 (paper 20)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46,49-51,57-60 and 91-98* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10,11,13-19,22,23,29,32,33,40-46,49-51 and 57-60* is/are allowed.

6)☒ Claim(s) *1-9,12,20, 21, 24,25-28, 30,31,34-39 and 91-98* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *21*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Remarks

1. Applicant's Remarks (paper 20) filed on May 17, 2004 have been fully considered.

(a) Applicant disagrees that the prior art of Kley teaches "a platform having a second substrate comprising silicon dioxide" (page 33 of the Remarks, lines 10 and 11). Applicant states that Kley's tip 132 is not a platform (page 33 of the Remarks, lines 6 and 7). Accordingly, a newly found prior art of Carver (U.S. Patent 4,916,002) having a movable read/write platform (cantilever) having a second substrate made of silicon dioxide is cited as a secondary reference.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

3. Claims 1-9, 12, 24, 25, 30, 31, 34-36, 38, 39 and 91-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (U.S. Patent 5,471,064) in view of Duerig et

al. (U.S. Patent 4,831,614) and Carver (U.S. Patent 4,916,002).

Koyanagi teaches a memory apparatus very similar to that of the present invention. For example, Koyanagi teaches the following:

(a) as in claim 1, a moveable media 4 having a surface 4 for placing anomalies thereon (Figs. 4, 5a, 5b and 5c);

(b) as in claim 1, a moveable read/write mechanism 5 comprising a moveable platform (Fig. 4);

(c) as in claim 1, a tip 25 connected with the moveable read/write platform 5 (Fig. 4);

(d) as in claim 1, a media movement mechanism 401 operably attached to the moveable media 4 and configured to move the media in response to media control signals (Fig. 4);

(e) as in claim 1, a read/write platform movement mechanism operably attached to the read/write platform 5 and configured to move the read/write platform in response to a read/write platform control signals (Fig. 4);

(f) as in claim 1, the tip 25 can cause the formation of an anomaly on the surface and read an anomaly on the surface (Figs. 4, 5a, 5b and 5c);

(g) as in claim 2, an i/o device 10a having an addressing port for identifying an address corresponding to an area of the media surface where data is to be one of written and read (Fig.

4; XYZ drive controller 10a identifies an address to be written);

(h) as in claim 2, an i/o port 11, 12 for transferring one of data to be read from and written to the media surface via the at least one fine tip portion (Fig. 4);

(i) as in claim 2, an addressing control device 10a configured to send control signals to each of the media and platform movement mechanisms so that the at least one fine tip portion passes an area on the media surface corresponding to an address identified at the addressing port (Fig. 4; XYZ are the control signals);

(j) as in claim 3, the writing fine tip portion 25 comprises an electromagnetic radiation energy source (Fig. 4; write mode);

(k) as in claim 4, the reading fine tip portion 25 comprises an electromagnetic radiation sensitive receptor (Fig. 4; read mode);

(l) as in claim 5, the writing fine tip portion 25 applies a repositioning force comprising at least one of a mechanical force, chemical force, electrostatic force, electromagnetic radiation, and magnetic field to cause the anomalies (Fig. 4);

(m) as in claim 6, the writing fine tip portion 25 utilizes the repositioning force to at least one of remove and

reposition of at least one of atoms, molecules, electrons, and magnetic domains at least one of above, on and below the media surface to cause the anomalies (Fig. 4, 5a, 5b and 5c);

(n) as in claim 7, the reading fine tip 25 is configured to detect at least one of current, voltage electromagnetic radiation, vibration parameters [phase and amplitude] having been one of caused or affected by the anomalies (Figs. 7a and 7b);

(o) as in claim 8, an analysis device 8 configured to analyze at least one of, patterns of current between the reading fine tip and the media surface, patterns of electromagnetic radiation received from the media surface in response to a stimulus patterns of shifting phase of vibrations of the reading fine tip; patterns of changing amplitude of the reading fine tip; and patterns of at least one of current and voltage between the reading fine tip and the media surface (Fig. 4);

(p) as in claim 9, least one of the media movement mechanism 401 and the platform movement mechanism 5 comprises an electrostatic device constructed to move at least one of the media and the platform based on an applied electrostatic potential (Fig. 4);

(q) as in claim 9, an electrostatic control and supply device 12 connected to the addressing control device and

configured to apply an electrostatic potential to the electrostatic device to move at least one of the media and the platform to pass the area on the media surface according to the control signals sent by the addressing control device (Fig. 4; electrostatic controller is an inherent feature for driving the tip 25 and media 4);

(r) as in claim 12, a calibration mechanism 9 configured to move the media 4 and the platform 5 to a full extent of a range of motions and determined amounts of electrostatic force needed to move the media 4 to plural positions in relation to the platform (Fig. 1);

(s) as in claims 24 and 25, the media is constructed from a substrate having surface texture on the media (Fig. 5a-c);

(t) as in claim 30, at least one positioning mechanism 5 attached to the platform and at least one of the fine tip portions, the positioning mechanism configured to position the fine tip portion at one of at, above, and below the media surface while reading, and position the fine tip at one of at, above, and below the media surface while writing (Fig. 4);

(u) as in claim 31, a cantilever 3 attached to each fine tip portion 1; and an activation/pickup device connected to each cantilever (Fig. 2; column 5, lines 22-36);

(v) as in claim 34, a source 200 configured to produce electromagnetic radiation emanations; and a focusing device 17

configured to direct the emanations to a predetermined location on the media surface (Fig. 2);

(w) as in claim 35, a receptor 201 configured to receive a return of the emanation from the media surface (Fig. 2);

(x) as in claim 36, the source 200 comprises one of a light emitting diode; and the focusing device 17 comprises a waveguide 13 configured to direct a narrow beam from the fine tip (Fig. 2);

(y) as in claim 38, a z-axis mechanism 5 connected to at least one of the fine tip portions 1 and the platform, wherein the z-axis mechanism is configured to place the at least one of the fine tip portions at least one of on and near the media surface (Figs. 1 and 4); and

(z) as in claim 39, each fine tip portion 1 comprises a cantilever 3 having a chamfered tip; and a z-axis drive mechanism 5 attached to the platform 5 and connected to the cantilever; wherein the z-axis drive mechanism is configured to place the cantilever at least one of on and a close proximity to the media surface (Figs 1 and 4).

However, Koyanagi does not teach the following:

(a) as in claim 1, the moveable media having a first substrate comprising silicon dioxide;

(b) as in claim 1, a plurality of tips;

(c) as in claim 1, each of the at least one fine tip

portion is adapted to be independently actuated toward the media surface; and

(d) as in claim 1, the moveable platform having a second substrate comprising silicon dioxide.

Duerig teaches the following:

(a) a moveable media 1 having a first substrate 2 made of silicon dioxide (Fig. 1; column 3, lines 32-36);

(b) a plurality of tips 13 (Fig. 4; an array of tips 10); and

(c) each of the at least one tip 13 is adapted to be independently actuated toward the media surface (Fig. 8; column 4, lines 24-28).

Carver teaches the following:

(a) a moveable platform (cantilever) having a second substrate 32 comprising silicon dioxide (Figs. 6E and 8; column 5, lines 58 and 59).

The substrate of a recording media is usually made of a silicon material such as glass because it is a transparent material for transmitting a light beam. In addition, in the field of ATM or AFM, the substrate of the recording media also requires the silicon material be non-conductive and heat insulative. Since Koyanagi's data recording means 4 is under electrical voltage, it would have been obvious to one of ordinary skill in the art to use a silicon dioxide as a

substrate layer of the media such as Duerig's, because the silicon dioxide is both a ceramic material which is very stable under high temperature and a dielectric material which is not conductive.

On the other hand, there is an advantage of accessing multiple anomalies at the same time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to fabricate a plurality of tips which is independently actuated such as Duerig's, because the multiple actuating tips can read/write anomalies simultaneously.

To securely attach a read/write head such as Koyanagi's, tip 1 to its moveable platform/cantilever, it would have been obvious to one of ordinary skill in the art at the time of invention to manufacture a tip from a substrate containing silicon dioxide material such as Carver's cantilever layer 32, because the silicon dioxide holds the tip with a strong mechanical bonding.

4. Claim 91 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 91 however also recites the following limitations:

(a) as in claim 91, the first and second substrates expand at substantially the same rate over an operating temperature range.

Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same rate.

5. Claim 92 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 92 however also recites the following limitations:

(a) as in claim 92, the first substrate comprises a dielectric;

(b) as in claim 92, the second substrate comprises an oxide; expand at substantially the same rate over an operating temperature range; and

(c) as in claim 92, the first and second substrates expand at substantially the same rate over an operating temperature range.

Respect to the first and second substrates, Koyanagi in view of Duerig et al. and Carver teach that the first substrate is a dielectric material made of silicon dioxide and the second substrate is an dioxide material made of silicon dioxide.

Respect to the expansion of the substrates, Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same rate.

6. Claim 93 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 93 however also recites the following limitations:

(a) as in claim 93, the first substrate comprises an insulator;

(b) as in claim 93, the second substrate comprises an oxide; expand at substantially the same rate over an operating temperature range; and

(c) as in claim 93, the first and second substrates expand at substantially the same rate over an operating temperature range.

Respect to the first and second substrates, Koyanagi in view of Duerig et al. and Carver teach that the first substrate is a insulator made of dielectric material such as silicon dioxide and the second substrate is an dioxide material made of silicon dioxide.

Respect to the expansion of the substrates, Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same

rate.

7. Claim 94 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 94 however also recites the following limitations:

(a) as in claim 94, the first substrate comprises a dielectric; and

(b) as in claim 94, the first and second substrates expand at substantially the same rate over an operating temperature range.

Respect to the first substrate, Koyanagi in view of Duerig et al. and Carver teach that the first substrate is a dielectric material made of silicon dioxide.

Respect to the expansion of the substrates, Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same rate.

8. Claim 95 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 95 however also recites the following limitations:

(a) as in claim 95, the first substrate comprises an insulator; and

(b) as in claim 95, the first and second substrates expand at substantially the same rate over an operating temperature range.

Respect to the first substrate, Koyanagi in view of Duerig et al. and Carver teach that the first substrate is an insulator made of a dielectric material such as silicon dioxide.

Respect to the expansion of the substrates, Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same rate.

9. Claims 96-98 have limitations similar to those treated in the above rejection, and are met by the references as discussed above. Claims 97-98 however also recite the following limitations:

(a) as in claim 97, the first and the second substrates are the same;

(b) as in claim 98, first and the second substrates comprised different material;

(c) as in claim 96, the first and second substrates expand at substantially the same rate over an operating temperature range.

Respect to the first and second substrates, Koyanagi in view of Duerig et al. and Carver teach that the first and second substrates are made of the same material of silicon dioxide.

On the other hand, Koyanagi in view of Duerig et al. and Carver also teach that the first and second substrates are not the same. For example, Carver teaches the second substrate 34 is not made of silicon dioxide (Fig. 8; column 5, lines 60-65).

Respect to the expansion of the substrates, Although Koyanagi et al. in view of Duerig et al. and Carver do not teach the silicon dioxide expand the same rate over an operating temperature, since both substrates made of the same material under the same operating environment, it would have

been obvious to one of ordinary skill in the art to conclude that both silicon dioxide substrates are expanded at the same rate.

10. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (U.S. Patent 5,471,064) in view of Duerig et al. (U.S. Patent 4,831,614) and Carver (U.S. Patent 4,916,002) and further in view of Adderton et al. (U.S. Patent 6,196,061).

Koyanagi teaches a memory apparatus very similar to that of the present invention. For example, Koyanagi teaches the following:

(a) as in claim 20, the drive mechanism 5 includes actuators, coupling rod 21, electrical paths and electrical supplies (Fig. 3); and

(b) as in claim 21, a sensor 8 configured to detect an amount of movement of the actuators; wherein the sensor provides feedback to a control device regulating an amount of the electricity supplied.

However, Koyanagi in view of Duerig et al. and Carver do not teach the following:

(a) as in claim 20, the media movement mechanism and the platform movement mechanism comprises a thermal drive mechanism.

Adderton teaches the following:

(a) the platform movement mechanism comprises a thermal drive mechanism 154 (Fig. 2; column 13, lines 10 and 11).

A scanning probe is generally driven by a piezo-electric actuator. However, a thermal actuator has a higher image quality because of its longer actuating range. When there is an advantage of extending a scanning probe closer to a scanned object such as Koyanagi's recorded data, it would have been obvious to one of ordinary skill in the art at the time of invention to replace Koyanagi's piezo-electric probe actuator with Adderton's thermal actuator, because the thermal actuator can drive the probe closer to the recording surface which results in lower noise and higher reliability in accessing data.

11. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (U.S. Patent 5,471,064) in view of Duerig et al. (U.S. Patent 4,831,614) and Carver (U.S. Patent 4,916,002) and further in view of Mamin et al. (U.S. Patent 5,804,710).

Koyanagi in view of Duerig et al. and Carver teach a memory apparatus very similar to that of the present invention. However, Koyanagi in view of Duerig and Carver do not teach the following:

(a) as in claim 26, the media comprises a substrate having a surface with track and sector marks; and

(b) as in claim 27, an alignment device configured to move the media and the platform such that the at least one fine tip portion moves across the track and sector marks and calibrate the media movement mechanisms based on detection of the track and sector marks by the at least one fine tip portion.

Mamin teaches a memory device having tracks, sector marks and alignment device as in above (a) and (b) (Figs. 1 and 8; column 10, lines 2-7).

Although Koyanagi in view of Duerig and Carver do not teach that the media have tracking means such as tracks and sector marks, however, tracking a recording medium is a required scanning mechanism because it aligns a scanning head

in a proper position with respect to the recording medium. For example, Mamin teaches tracks and sector marks which can be accessed by a scanning probe. Hence, it would have been obvious to one of ordinary skill in the art at the time of invention to align a scanning fine tip such as Koyanagi's in view of Duerig and Carver with tracks and sector marks such as Mamin's, because the tracks and sector marks deflect Koyanagyi's scanning tip which then generates servo signals to calibrate the XYZ driving devices.

12. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (U.S. Patent 5,471,064) in view of Duerig et al. (U.S. Patent 4,831,614) and Carver (U.S. Patent 4,916,002) and further in view of Miyazaki et al. (U.S. Patent 5,412,597).

Koyanagi in view of Duerig and Carver teach a memory apparatus very similar to that of the present invention. However, Koyanagi in view of Duerig and Carver do not teach the following:

(a) as in claim 28, at least one fine tip portion comprises an arm having a chamfered tip coated in a ferromagnetic material; and

(d) as in claim 28, the fine tip portion is configured to detect at least one of magnetic domains and magnetic domain voids on the media surface.

Miyazaki teaches a scan type magnetic force microscope having a ferromagnetic tip to detect magnetic domains and voids on a media surface (column 13, lines 58-68).

A scanning tunnel probe such as Applicant's can be operated in an AFM mode such as Koyanagi's or a MFM mode such as Miyazaki's. In other words, instead of detecting atomic force on a media surface with Koyanagi's AFM tip, magnetic orientation on the media surface can be detected as well. As an alternative of forming Applicant's read/write device, it would have been obvious to one of ordinary skill in the art at the time of invention to replace Koyanagi's AFM tip with Miayzaki's MFM tip, because the MFM tip can detect local magnetic force of anomalies formed on the media surface.

13. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (U.S. Patent 5,471,064) in view of in view of Duerig et al. (U.S. Patent 4,831,614) and Carver (U.S. Patent 4,916,002) and further in view of Tanaka (U.S. Patent 5,808,973).

Koyanagi in view of Duerig and Carver teach a memory apparatus very similar to that of the present invention. However, Koyanagi in view of Duerig and Carver do not teach the following:

(a) as in claim 37, the receptor comprises a polarizing film and a photodiode.

Tanaka teaches a photodetector 37 with a polarizer 38 (Fig. 2).

When Applicant's scanning device is used as a magnetic recording/reproducing apparatus such as Tanaka's, the reflected electromagnetic wave is polarized. It is required to remove the polarization in order to reproduce the original orientation of the wave. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to replace Koyanagi's laser irradiating head and photodetector 201 with Tanaka's head member 2, because the head member of Tanaka's photodetector has a polarizer means which can eliminate unwanted polarized electromagnetic waves reflected from the media.

Allowable Subject Matter

14. Claims 10, 11, 13-19, 22, 23, 29, 32, 33, 40-46, 49-51 and 57-60 are allowable over prior art.

15. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

As in claim 10, the prior art of record fails to teach or fairly suggest that the electrostatic device comprises a series of prong sets, wherein, the prong sets are attached in series such that a first of the prong sets is attached at a first end to a fixed position of the apparatus, and a second end of the first prong set is attached to a first end of a second of the prong sets, and so on, until a last of the prong sets is attached at a first end to a second end of an n-1 prong set, and a second end of the last (n) prong set is attached to one of the media and the platform.

As in claim 22, the prior art of record fails to teach or fairly suggest that wherein the capacitance sensor comprises a fixed comb having fingers protruding in an x-axis direction, a moving comb connected to the coupling having fingers protruding in an x-axis direction and interleaved among the fingers of the fixed comb.

As in claim 23, the prior art of record fails to teach or fairly suggest that a capacitive comb array comprises a fixed

comb and a moving comb each having a set of fingers interleaved between the other set of fingers.

As in claim 29, the prior art of record fails to teaches or fairly suggest that a re-planing device configured to remove at least 4 part of each anomaly on the media surface.

As in claim 32, the prior art of record fails to teach or fairly suggest that the activation/pickup device is at least one of electrostatically and capacitively activated causing the cantilever to vibrate near a resonance frequency of the cantilever; and the activation/pickup mechanism is configured to detect a phase change of vibrations of the cantilever caused by the fine tip interacting with the media surface via at least one of electrical, magnetic, and physical forces.

As in claim 33, the prior art of record fails to teach or fairly suggest that a cleaning device configured to remove unwanted 4 particles from the fine tip.

As in claims 40 and 41, the prior art of record fails to teach or fairly suggest that the z-axis drive mechanism comprises a cantilever connected to the fine tip portion at one end, and at least one set of comb fingers rotatably attached to the platform allowing movement of the cantilever and the fine tip portion in at least a z-axis direction.

As in claim 43, the prior art of record fails to teach or fairly suggest that the z-axis drive mechanism comprises

a lever connected to the fine tip portion at one end; a torsion bar connected at a second end of the lever; an isolation bridge connected at one of the second end of the lever and the torsion bar; a second torsion bar connected to the isolation bridge.

As in claim 45, the prior art of record fails to teach or fairly suggest that the z-axis drive mechanism comprises a lever connected to the fine tip portion at one end; a thermal bimorph, comprising a heater, and at least two materials of different expansion coefficients; wherein a current applied to the heater raises the temperature of the bimorph, causing the bimorph to expand or contract and move the lever and the fine tip portion in a z-axis direction.

As in claim 49, the prior art of record fails to teach or fairly suggest that a cantilever having the fine tip attached at a first end; a moving assembly attached to the cantilever, comprising, a torsion bar electrically isolated and attached to the cantilever, and a force receiver attached to the cantilever and configured to apply force to the cantilever.

As in claim 57, the prior art of record fails to teach or fairly suggest that nubs are placed between the media and the platform for providing a bearing for movement of the platform relative to the media.

As in claim 58, the prior art of record fails to teaches or fairly suggest that the media comprises an amplifying media having electrodes at ends of the media, and a control area activated by the tips.

As in claim 59, the prior art of record fails to teach or fairly suggest that the media comprises a material having energy wells with increased capacitance for storing data on the media.

Prior Art

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Albrecht et al. (4,968,595) is pertinent because Albrecht teaches a cantilever made of a silicon dioxide substrate.

17. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C. 20231 Or faxed to:

(703) 872-9306 (for formal communications intended for entry. Or:

(703) 746-6909, (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim CHU whose telephone number is (703) 305-3032 between 9:30 am to 6:00 pm, Monday to Friday.

KC 8/9/04

Kim-Kwok CHU
Examiner AU2653
August 9, 2004

(703) 305-3032

A. J. HEINZ
PRIMARY EXAMINER
GROUP ~~2600~~ 2653

A. J. Heinz